

Ecological Site Description—Rangeland

Silty–Steep, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East
MLRA: 60B – Pierre Shale Plains, East
R058AE004MT, R060BE585MT

Site Name: Silty–Steep (SiStp), 10–14 inches Mean Annual Precipitation (MAP) (FORMERLY THIN SILTY)

Site Number: R058AE004MT, R060BE585MT

Major Land Resource Areas: 58A – Northern Rolling High Plains, North Part
60B – Pierre Shale Plains, North Part

Rangeland Resource Units: 58AE – Sedimentary Plains, East
60BE – Pierre Shale Plains, East

1. Physiographic Features: This ecological site occurs on moderately steep to steep sedimentary plains, hills, and hill slopes. Slopes are mainly between 15 and 45%. This site occurs on all exposures and aspect can be significant to plant growth on steeper slopes. Variations in plant community composition and production can result due to aspect, depending somewhat on slope length. Runoff and potential for water erosion are important features of this site.

Elevation (feet): 1,900–3,500
Landform: hill, plain, ridge
Slope (percent): 15–45
Depth to Water Table (inches): greater than 60
Flooding: none
Ponding: none
Runoff Class: medium to high
Aspect: all

2. Climatic Features: MLRAs 58A and 60B are considered to have a continental climate characterized by cold winters, hot summers, low humidity, light rainfall, and much sunshine. Extremes in temperature are typical. The climate is the result of this MLRA's location in the geographic center of North America. There are few natural barriers on the northern Great Plains and the winds move freely across the plains and account for rapid changes in temperature. Seasonal precipitation is often limiting for plant growth. Annual fluctuations in species composition and total production are typical depending on the amount and timing of rainfall. See Climatic Data Sheet MLRA 58A, east and 60B, for more details (Section II of the NRCS Field Office Technical Guide). For local climate station information, refer to <http://www.wcc.nrcs.usda.gov>.

Frost-free period (32° F) - days: 105–145
Freeze-free period (28° F) - days: 125–170
Mean annual precipitation (inches): 10–14

3. Influencing Water Features: None

4. Associated sites: This is a common ecological site in the Eastern Sedimentary Plains and can be associated with most of the other sites that occur here. The most common associated sites include Silty and Shallow, as the Silty–Steep site often occurs as a transition between them.

5. Similar sites: Silty, Clayey–Steep, Sandy–Steep, Shallow, Shallow to Gravel:

The Silty site differs by being mainly on slopes less than 15%.

The Clayey–Steep and Sandy–Steep sites occupy similar landscape positions, but will differ in textures.

The Shallow site may have similar textures, but will be shallow (20 inches or less) to bedrock or semi-consolidated sedimentary beds.

The Shallow to Gravel site will have similar textures, but will be shallow (20 inches or less) to sandy gravel.

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6. Soils: These soils are moderately deep to very deep loamy soils on steep or hilly landscapes. Permeability is mostly moderate with some being moderately slow, and effective rooting depth is greater than 20 inches. The major limitation to plant growth is the reduced effective moisture due to slope and the potential for runoff.

Parent material (kind): alluvium, residuum, colluvium**Parent material (origin):** semi-consolidated loamy sedimentary beds**Surface textures:** loam, silt loam, or very fine sandy loam**Subsurface Fragments $\leq 3"$ (% volume):** 0–5**Depth (inches):** greater than 20**Soil surface permeability (inches per hour):** moderate ((0.6–2.0) to moderately slow (0.2–0.6)**Available Water Holding Capacity to 40" (inches):** 5–8**Drainage Class:** well**Salinity/Electrical Conductivity (mmhos/cm):** non-saline (0–2)**Sodium Absorption Ratio (SAR):** negligible**Reaction (pH) (1:1 water):** neutral to moderately alkaline (6.6–8.4)

6a. Representative Soils: Listed below are soils and map units which characterize this site in various counties. (Reference MT-165, Soil Interpretive Rating Report).

COUNTIES	TYPICAL SOILS	MAP UNIT
Big Horn	Theadalund loam	THa, THg, THm
Carter	Delpoint loam	270E
Carter	Yamacall loam	386E
Custer	Delpoint loam	554E, 381F
Custer	Cambeth silt loam	293E, 297E
Fallon	Delpoint loam	270E
Fallon	Yamacall loam	386E
Garfield	Delpoint loam	431E, 435E
Garfield	Cambeth silt loam	374E, 377E
McCone	Yamac loam	23
Musselshell	Delpoint loam	84C, 84E
Prairie	Cambeth silt loam	24, 25
Prairie	Delpoint loam	45, 46, 47
Rosebud	Delpoint loam	72, 73
Rosebud	Yamac loam	203, 204
Treasure	Bainville loam	Bn, Mt

7. Plant Community and Species Composition: The physical aspect of this site in Historical Climax is that of a steeply sloping grassland dominated by cool and warm season grasses with scattered shrub cover. Approximately 70–75% of the annual production is from grasses and sedges, 5–15% from forbs, and 5–10% is from shrubs and half-shrubs. The canopy cover of shrubs is 5 to 10%.

TABLE 7a.—Major Plant Species Composition, lists plant species composition and production by dry weight for the Historic Climax (HCPC) or Potential Plant Community (PPC) for this site. The Historic Climax or Potential Plant community has been determined by the study of rangeland relict areas, exclosures, or areas protected from excessive grazing. Total annual production has been derived from several data sources, and has been adjusted to represent a typical annual moisture cycle for the site. Reference for plant species names and symbols: USDA–NRCS PLANTS Database at <http://plants.usda.gov>.

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7a. Major Plant Species Composition – Historic Climax/Potential Plant Community

Common Name	Plant Symbol	Plant Group	Percent Comp.	Group Max. %	Mean Annual Precipitation (MAP) (inches)				
					10 (lbs./acre)	11 (lbs./acre)	12 (lbs./acre)	13 (lbs./acre)	14 (lbs./acre)
Grasses and Sedges 70–75%					600	750	900	1050	1200
Little bluestem	ANSC10	1	15-30		120-240	150-300	180-360	210-420	240-480
Western or Thickspike wheatgrass	PASM ELLAL	14	10-15		80-120	100-150	120-180	140-210	160-240
Big bluestem	ANGE	1	10-15		80-120	100-150	120-180	140-210	160-240
Bluebunch wheatgrass	PSSP6	2	10-40		80-320	100-400	120-480	140-560	160-640
Needleandthread	HECOC8	10	5-10		40-80	50-100	60-120	70-140	80-160
Sideoats grama	BOCU	3	5-15		40-120	50-150	60-180	70-210	80-240
Plains muhly	MUCU3	3	5-10		40-80	50-100	60-120	70-140	80-160
Green needlegrass	NAVI	2	5-10		40-80	50-100	60-120	70-140	80-160
Prairie sandreed	CALO		1-5		8-40	10-50	12-60	14-70	16-80
Threadleaf sedge	CAFI	12	1-5}	10	8-120 No More Than 40 for Any one	10-100 No more Than 50 for Any one	12-120 No more Than 60 for Any one	14-140 No more Than 70 for Any one	16-160 No more Than 80 for Any one
Blue grama	BOGR2	15	1-5}						
Prairie junegrass	KOMA	12	1-5}						
Sandberg bluegrass	POSE	12	1-5}						
Sand dropseed	SPCR	9	1-5}						
Plains reedgrass	CAMO	16	1-5}						
Bottlebrush squirreltail	ELEL5	10	1-5}						
Needleleaf sedge	CADU6	16	1-5}						
Other native grasses	2GP		1-5}						
Fendler's / Red threeawn	ARPUF	11	0 -T	T	T	T	T	T	T
Forbs 5–15%					120	150	180	210	240
Black samson	ECPA	21	1-5}	15	8-120 No more Than 40 for Any one	10-150 No more Than 50 for Any one	12-180 No more Than 60 for Any one	14-210 No more Than 70 for Any one	16-240 No more Than 80 for Any one
Scurfpea spp.	PSORA2	23	1-5}						
Purple prairieclover	DAPU5	21	1-5}						
Hairy goldenaster	HEVI4	23	1-5}						
Prairie coneflower	RACO3	23	1-5}						
Dotted gayfeather	LIPU	21	1-5}						
American vetch	VIAM	18	1-5}						
Milkvetch spp.	ASTRA	24	1-5}						
Hood's phlox	PHHO	28	1-5}						
Buckwheat spp.	ERIOG	23	1-5}						
Biscuitroot spp.	LOMAT	24	1-5}						
Missouri goldenrod	SOMI2	19	1-5}						
Western yarrow	ACMI2	19	1-5}						
Aster spp.	ASTER	19	1-5}						
Green sagewort	ARDR4	19	1-5}						
Scarlet globemallow	SPCO	20	1-5}						
Pussytoes spp.	ANTEN	20	1-5}						
Other native forbs	2FP		1-5}						
Twogrooved poisonvetch *	ASBI2	24	0-T	T	T	T	T	T	
White point loco *	OXSE	24	0-T	T	T	T	T	T	
Larkspur spp. *	DELPH	24	0-T	T	T	T	T	T	
Death camas *	ZIGAD	32	0-T	T	T	T	T	T	
Shrubs, Half-shrubs, and Trees 5–10%					80	100	120	140	160
Winterfat	KRLA2	35	1-5}	10	8-80 No more Than 40 for Any one	10-100 No more Than 50 for Any one	12-120 No more Than 60 for Any one	14-140 No more Than 70 for Any one	16-160 No more Than 80 for Any one
Nuttall's saltbush	ATNU2	34	1-5}						
Rose spp.	ROSA+	38	1-5}						
Silver sagebrush	ARCA13	36	1-5}						
Green rabbitbrush	CHVI8	36	0-5}						
Rubber rabbitbrush	ERNAN5	36	0-5}						
Wyoming big sagebrush	ARTRW8	37	1-5}						
Snowberry spp.	SYMPH	37	1-5}						
Fringed sagewort	ARFR4	38	1-5}						
Yucca	YUGL	37	1-5}						
Other native shrubs	2SB		1-5}						
Chokecherry	PRVI	37	1-5)*	5	* These species found on micro sites, cut slopes, snow deposition areas, etc. Count no more for each spp. than shown above for each ppt. zone.				
Silver buffaloberry	SHAR	37	1-5)*						
Rocky Mountain juniper	JUSC2	37	1-5)*						
Ponderosa pine	PIPO	36	1-5)*						
Creeping juniper	JUHO2	38	1-5)*						
Plains pricklypear	OPPO	38	0-T	T	T	T	T	T	T
Broom snakeweed	GUSA2	37	0-T	T	T	T	T	T	T
Total Annual Production (lbs./acre)			100%		800	1000	1200	1400	1600

* These species are poisonous to some grazing animals during at least some portion of their life cycle.

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7b. Plant Group Descriptions: Plant functional groups are based on: season of growth, growth form, stature, type of root system, and ecological response to disturbance. Refer to Field Office Technical Guide (FOTG) Section II for a complete description of plant groups.

8. Total Annual Production: Total annual production is a measurement of the total aboveground production (dry weight) of all major plant species that occur on the site during a single growth year, regardless of preference to grazing animals. This information is listed at the bottom of TABLE 7a.—Major Plant Species Composition. Average production values are listed for each incremental inch of precipitation for the site.

9. Cover and structure: The following table shows the approximate amounts of basal cover, canopy cover, and plant heights for this site in the Historic Climax or Potential Plant Community.

COVER TYPE	BASAL COVER (%)	CANOPY COVER (%)	AVERAGE HEIGHT (inches)
Cryptogams	T – 1	0 – T	0.25
Grasses/ sedges	5 – 15	60 – 70	24
Forbs	1 – 4	1 – 5	18
Shrubs	1 – 3	5 – 10	24
Litter	40 – 48		
Coarse fragments	0 – 4		
Bare ground	20 – 25		

10. Ecological Dynamics: This site developed under Northern Great Plains climatic conditions, which included the natural influence of large herbivores and occasional fire. The plant community upon which interpretations are primarily based is called the Historic Climax (HCPC) or Potential Plant Community. This community is listed as a reference to understand the original potential of this site, and is not always considered to be the management goal for every acre of rangeland. The following descriptions should enable the landowner or manager to better understand which plant communities occupy their land, and assist with setting goals for vegetation management. It can also be useful to understand the environmental and economic values of each plant community.

This site has moderate resilience to disturbance as it has only moderate soil limitations for plant growth (slope). Changes may occur to the Historic Climax Plant Community due to management actions and/or climatic conditions. Under continued adverse impacts, a moderate to extreme decline in vegetative vigor and composition will occur. Under favorable vegetative management, this site can more readily return to the Historic Climax Plant Community (HCPC).

Continual adverse impacts to the site over a period of years results in a departure from the HCPC, with a decrease of the taller, more palatable species such as **bluebunch wheatgrass, little bluestem, and plains muhly**. These plants will be replaced over time by **needleandthread, western or thickspike wheatgrass, sand dropseed, threadleaf sedge, blue grama, non-palatable forbs, and Wyoming big sagebrush**. **Kentucky bluegrass** is a common invader onto this site on cooler slopes, and in higher precipitation zones.

Other plants that are not a part of the climax community that are most likely to invade are **annual bromes, six-weeks fescue, false buffalograss, broom snakeweed, and thistles**. Continued deterioration results in increased amounts of **bottlebrush squirreltail, red threeawn, and fringed and green sagewort**.

Long-term non-use (>3 years) combined with the absence of fire will result in excessive litter and decadent plants in the bunchgrass communities at higher precipitation zones, 12–14 inches.

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10b. Major Plant Community Types: Following are descriptions of several plant communities that may occupy this site.

Plant Community 1a and 1b: Tall and Medium Grasses /Forbs /Shrubs: These are the interpretive plant communities and are considered to be the Historic Climax Plant Community (HCPC) or Potential Plant Community (PPC) for this site. Communities 1a and 1b differ mainly because of aspect, with the "moist" community being located on north and east aspects, while the "dry" community would be on the south and west. These plant communities contain a high diversity of tall and medium height, cool and warm season grasses (**bluebunch wheatgrass, green needlegrass, little bluestem, western wheatgrass, and plains muhly**) with a diverse mix of other grasses and sedges (**needleandthread, threadleaf sedge, prairie junegrass, and Sandberg bluegrass**). Several forbs, shrubs, and half-shrubs also occur on this site, but in relatively small percentages. Common shrubs are **Wyoming big sagebrush, winterfat, snowberry, prairie rose, and creeping juniper**. Trees such as **Ponderosa pine and Rocky Mountain juniper** occur occasionally.

This plant community is well adapted to the Northern Great Plains climatic conditions. The diversity in plant species and presence of tall, deep-rooted perennial grasses allows for site resilience to natural disturbances such as drought, fire, and insects. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Plants on this site have strong, healthy root systems that allow production to increase significantly with favorable precipitation. Abundant plant litter is available for soil building and moisture retention. Plant litter is properly distributed with very little movement off-site and natural plant mortality is very low. High available water capacity provides a favorable soil-water-plant relationship. This plant community provides for soil stability and a functioning hydrologic cycle.

Plant Community 2a: Medium and Short Grasses/ Medium Shrubs: With slight disturbance the HCPC/PPC will tend to change to a community dominated by medium and short grasses, such as **western wheatgrass, needleandthread, Sandberg bluegrass, blue grama, and threadleaf sedge**. The tall, more palatable grasses (**bluebunch wheatgrass, green needlegrass**) will be present in smaller percentages. There may be an increase in the amount of **Wyoming big sagebrush**. Palatable and nutritious forbs will be replaced by less desirable and more aggressive species. Implementing a prescribed grazing plan should bring this community back to a 1a.

Plant Community 2b: Medium and Short Grasses/ Invader Grasses/ Medium and Low Shrubs: With slight disturbance, Community 1b (cool and moist slopes) will tend to change to a community similar to 2a, except **Kentucky bluegrass** may invade in significant amounts in higher moisture zones (13–14"). **Creeping juniper, snowberry, and prairie rose** also increase on the site. Implementing a prescribed grazing plan can often restore this community back to one similar to 1b.

Grass biomass production and litter become reduced on Communities 2a and 2b as the taller grasses decrease in production, increasing evapotranspiration and reducing moisture retention. Additional open space in the community can result in undesirable invader species. These plant communities provide for moderate soil stability.

Plant Community 3: Medium and Short Grasses/ Medium Shrubs and Half-shrubs: With continued heavy disturbance Community 2a will become dominated by medium and short grasses, such as **needleandthread, prairie junegrass, western wheatgrass, blue grama, Sandberg bluegrass, and threadleaf sedge**. **Wyoming big sagebrush and fringed sagewort** increase. **Red threeawn, Japanese brome, and other annuals and biennials** may begin to occupy the site. The taller grasses will occur only occasionally. Palatable shrubs and forbs will be mostly absent.

Plant Community 4: Short Grasses /Invader Grasses /Medium and Low shrubs: With continued heavy disturbance Community 2b will become dominated by short grasses such as Sandberg bluegrass, prairie junegrass, blue grama, and threadleaf sedge. Kentucky bluegrass may invade significantly onto the site in higher moisture zones (13–14") and creeping juniper and fringed sagewort increase. Western yarrow and other non-palatable forbs increase. The taller grasses will occur only occasionally. Palatable shrubs and forbs will be mostly absent.

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Plant communities 3 and 4 are less productive than Plant Communities 1, 2a, or 2b. The lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and high evaporation. This community has lost many of the attributes of a healthy rangeland, including good infiltration, minimal erosion and runoff, nutrient cycling and energy flow.

These communities will respond positively to improved grazing management, but significant economic inputs and time would be required to move this plant community toward a higher successional stage and a more productive plant community. The presence of a large amount of Kentucky bluegrass would make this community more difficult to restore to one that resembles potential, as Kentucky bluegrass is a highly competitive species due to its rhizomatous root structure. The presence of Kentucky bluegrass substantially reduces the site's ability to withstand drought.

Plant Community 5: Short Grasses /Invader and Annual Grasses /Forbs, Medium and Low Shrubs:

Continued disturbance to Community 3 or 4 usually results in one that is dominated by **blue grama, red threeawn, and annual grasses**. Non-palatable forbs such as **western yarrow** become common.

Kentucky bluegrass may invade significantly onto the site in higher moisture zones (13–14"). Shrubs such as **fringed sagewort and creeping juniper** become prevalent on the site.

This plant community is significantly less productive than the HCPC and has lost many of the attributes of a healthy rangeland. The loss of deep perennial root systems reduces total available moisture for plant growth. Reduction of plant litter will result in higher surface soil temperatures and increased evaporation losses. Annual species are often aggressive and competitive with seedlings of perennial plants. This community can respond positively to improved grazing management but it may take additional inputs to move it towards a community similar in production and composition to that of Plant Communities 1 or 2. The presence of a large amount of Kentucky bluegrass would make this community more difficult to restore to one that resembles potential, as Kentucky bluegrass is a highly competitive species due to its rhizomatous root structure. The presence of Kentucky bluegrass substantially reduces the site's ability to withstand drought.

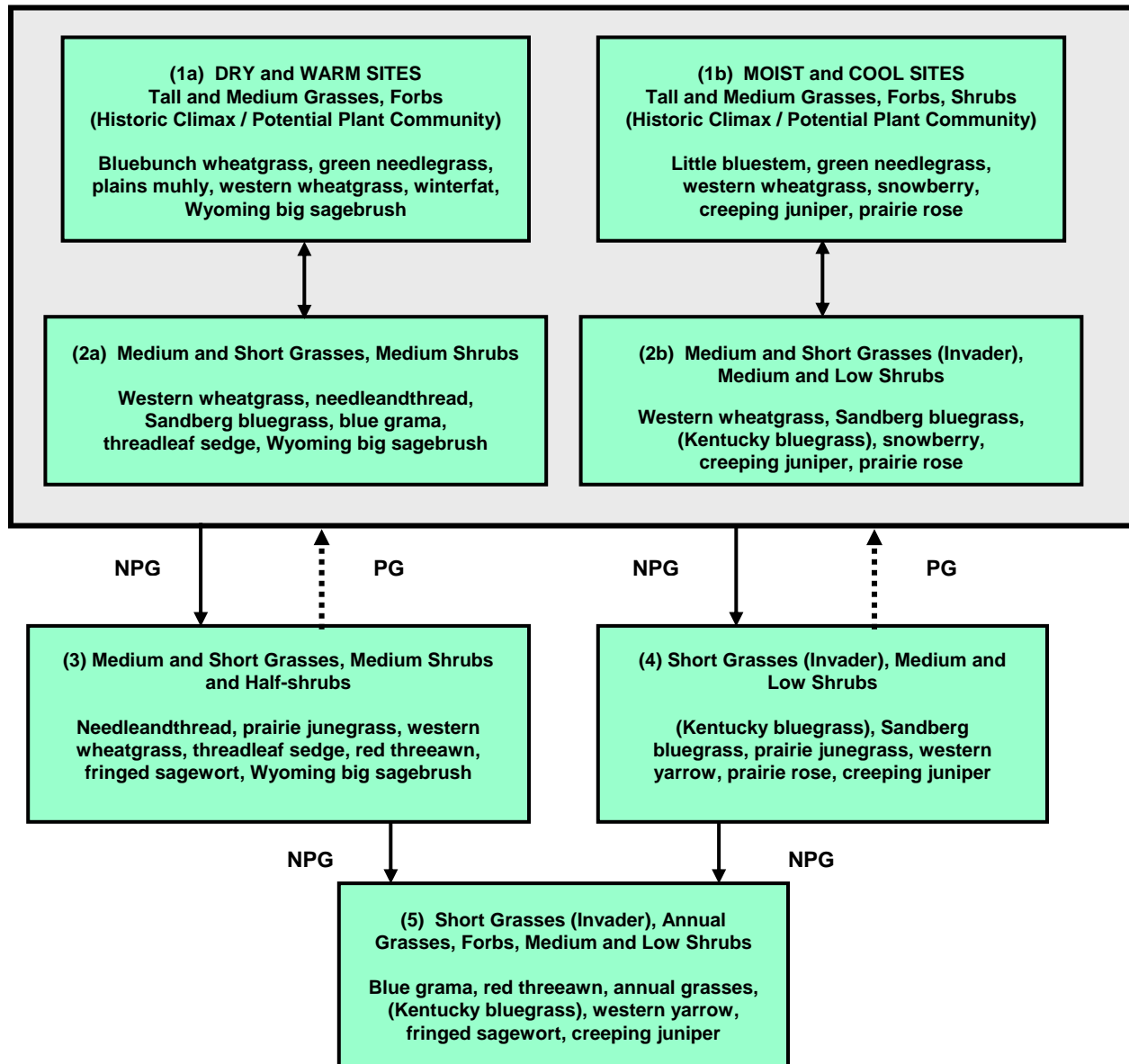
10b. Plant Communities and Transitional Pathways (State and Transition Model): Transitions in plant community composition occur along a gradient that is not linear. Many processes are involved in the changes from one community to another. Changes in climate, elevation, soils, landform, fire patterns and frequency, and grazing all play a role in determining which of the plant communities will be expressed. The following model outlines some of the various plant communities that may occur on this site and provides a diagram of the relationship between plant community and type of use or disturbance.

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Plant Communities and Transitional Pathways (diagram)



Smaller boxes within a larger box indicate that these communities will normally shift among themselves with slight variations in precipitation and other disturbances. Moving outside the larger box indicates the community has crossed a threshold (heavier line) and will require intensive treatment to return to Community 1 or 2. Dotted lines indicate a reduced probability for success.

NOTE: Not all species present in the community are listed in this table. Species listed are representative of the plant functional groups that occur in the community.

Pr G = Prescribed Grazing: Use of a planned grazing strategy to balance animal forage demand with available forage resources. Timing, duration, and frequency of grazing are controlled and some type of grazing rotation is applied to allow for plant recovery following grazing.

NPG = Non-Prescribed Grazing: Grazing which has taken place that does not control the factors as listed above, or animal forage demand is higher than the available forage supply.

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11. Plant Growth Curves: Growth of native cool-season plants begins in late April and continues to the end of June. Native warm-season plants begin growth about mid May and continue to about the end of August. Green up of cool-season plants can occur in September through October when adequate soil moisture is present. The following tables show the approximate percentage of total growth by month that is expected to occur in various plant communities on this site for a "typical" moisture year.

Growth Curve Number: MT0808

Growth Curve Description: Includes all sedimentary plains sites with deep, clayey textured upland soils and cool season grasses.

Totals for Each Month

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	0	25	30	30	5	5	5	0	0	0

Cumulative Totals by Month

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	0	25	55	85	90	95	100	0	0	0

Growth Curve Number: MT0810

Growth Curve Description: Includes all upland sites in eastern sedimentary plains having deep soils and mainly warm season plants.

Totals for Each Month

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	0	5	15	40	25	10	5	0	0	0

Cumulative Totals by Month

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	0	5	20	60	85	95	100	0	0	0

Growth Curve Number: MT0813

Growth Curve Description: Includes all low condition sites in eastern sedimentary plains, dominated by short grasses.

Totals for Each Month

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	0	25	25	25	10	10	5	0	0	0

Cumulative Totals by Month

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	0	25	50	75	85	95	100	0	0	0

12. Livestock Grazing Interpretations: Managed livestock grazing is suitable on this site as it has the potential to produce a moderate amount of high quality forage. Forage production is somewhat limited by steep slopes and the potential for runoff, reducing the effectiveness of the precipitation received for plant growth. The steeper slopes may also limit livestock travel and result in poor grazing distribution, especially in areas away from water. Management objectives should include maintenance or improvement of the plant community. Shorter grazing periods and adequate re-growth after grazing are recommended for plant maintenance and recovery. Non-prescribed grazing over a period of years will be detrimental to the site as it will alter the plant community composition and productivity.

Whenever Plant Communities 2a or 2b (medium and short grasses) occur, grazing management strategies need to be implemented to avoid further deterioration. These communities are still stable, productive, and healthy provided it receives proper management. These communities will respond favorably to improved grazing management including increased growing season rest of key forage plants. Grazing management alone can usually restore these communities back towards the potential community.

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Once this site is occupied by either Plant Community 3 or 4, it will be more difficult to restore it to a community that resembles the potential with grazing management alone. Additional growing season rest is often necessary for re-establishment of the desired species and to restore the stability and health of the site.

Plant Community 5 has extremely limited forage production (< 400 pounds per acre), and a high percentage of non-preferred species for cattle and sheep, (unless Kentucky bluegrass has invaded onto the site). Seeding may be necessary to restore desirable native perennial species. The potential for using seeding and mechanical treatment to improve site health is limited on this site due to steep slopes.

The presence of a large amount of Kentucky bluegrass would make this community more difficult to restore to one that resembles potential, as Kentucky bluegrass is a highly competitive species due to its rhizomatous root structure. The presence of Kentucky bluegrass substantially reduces the site's ability to withstand drought.

12a. Calculating Safe Stocking Rates: Proper stocking rates should be incorporated into a grazing management strategy that protects the resource, maintains or improves rangeland health, and is consistent with management objectives. Safe stocking rates will be based on useable forage production, and should consider ecological condition and trend of the vegetation, and past grazing use history.

Calculations used to determine a safe stocking rate are based on the amount of useable forage available, taking into account the harvest efficiency of the animal and the grazing strategy to be implemented. Average annual production must be measured or estimated to properly assess useable forage production and stocking rates.

12b. Guide to Safe Stocking Rates: The following charts provide a guide for determining a safe stocking rate. Animal Unit Month (AUM) figures are based on averages of forage production from data collected for this site over several years. The characteristic plant communities and production values listed may not accurately reflect the productivity of a specific piece of land, hence this table should not be used without on-site information as to current forage productivity of the site. Adjustments to stocking rates for each range unit must be made according to topography, slope, distance to livestock water, and other factors which effect livestock grazing behavior.

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12c. Stocking Rate Guide:

Major Plant Community Dominant Plant Species	MAP	Total Production (pounds/ac)	Cattle			Sheep		
			Forage Production	AUM/ac	Ac/AUM	Forage Production	AUM/ac	Ac/AUM
1a and 1b. Tall and Medium Grasses, Forbs, Shrubs (HCPC/PPC) <i>Little bluestem, bluebunch wheatgrass, green needlegrass, plains muhly, winterfat, snowberry</i> (S.I. >75%)	13–14"	1400–1600	1200–1350+	.38–.43+	2.3–2.6	1250–1450+	.4–.46+	2.2–2.5
	10–12"	800–1200	700–1000	.22–.32+	3.1–4.5	750–1100	.24–.35+	2.8–4.2
2a and 2b. Medium and Short Grasses, Medium and Low Shrubs <i>Western wheatgrass, Sandberg bluegrass, blue grama, threadleaf sedge, Kentucky bluegrass, Wyoming big sagebrush</i> (S.I. 55–75%)	13–14"	1200–1400	900–1200	.28–.38	2.6–3.6	950–1250	.30–.40	2.5–3.3
	10–12"	700–1000	500–850	.16–.27	3.7–6.2	550–900	.17–.28	3.6–5.9
3. Medium and Short Grasses, Medium Shrubs and Half-shrubs <i>Needleandthread, western wheatgrass, Sandberg bluegrass, threadleaf sedge, prairie junegrass, fringed sagewort</i> (S.I. 30–55%)	10–14"	600–1200	400–950	.13–.30	3.3–7.7	450–1000	.14–.32	3.1–7.1
4. Short Grasses (Invader), Low Shrubs <i>Sandberg bluegrass, prairie junegrass, (Kentucky bluegrass), creeping juniper</i> (S.I. 30–55%)	10–14"	500–1050	300–750	.09–.24	4.2–11.1	350–850	.11–.27	3.7–9.1
5. Short Grasses (Invader), Annual grasses, Low Shrubs <i>Blue grama, red threeawn, annual grasses, (Kentucky bluegrass), western yarrow, creeping juniper, fringed sagewort</i> (S.I. < 30%)	10–14"	400–800	200–400	.06–.13	7.7–16.7	200–500	.06–.16	6.2–16.7

Stocking rates are calculated from average forage production values using a 25% Harvest Efficiency factor for preferred & desirable plants, and 10% Harvest Efficiency for less desirable species. AUM calculations are based on 790 pounds per animal unit month (AUM) for a 1,000-pound cow with calf up to 4 months. No adjustments have been made for site grazability factors, such as steep slopes, site inaccessibility, or distance to drinking water.

Ecological Site Description—Rangeland

Silty–Steep, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East

MLRA: 60B – Pierre Shale Plains, East

R058AE004MT, R060BE585MT

12d. Plant Forage Preferences for Cattle and Sheep

Legend: P=Preferred D=Desirable U=Undesirable E=Emergency
N=Nonconsumed T=Toxic Blank=Unknown or no data

Winter (W) = Jan., Feb., March; Spring (SP) = April, May, June;
Summer (SU) = July, Aug., Sept.; Fall (F) = Oct., Nov., Dec.

PLANT NAME	Cattle				Sheep			
	W	SP	SU	F	W	SP	SU	F
Green needlegrass	P	P	P	P	P	P	P	P
Western wheatgrass	P	D	D	P	D	D	D	D
Thickspike wheatgrass	P	P	P	P	P	P	P	P
Little bluestem	P	P	P	P	U	D	D	U
Bluebunch wheatgrass	P	D	P	P	D	D	D	D
Sideoats grama	P	P	P	P	D	D	P	D
Needleandthread ^{1/}	D	D	D	D,T	D	D	D	D
Sandberg bluegrass	D	D	D	D	D	D	D	D
Threadleaf and Needleleaf sedge	D	P	P	D	D	P	P	D
Kentucky bluegrass ^{2/}	P	P	P	P	P	P	P	P
Prairie junegrass	D	D	D	D	D	P	D	D
Plains muhly	D	D	D	D	D	D	D	D
Blue grama	D	D	D	D	D	P	P	D
Plains reedgrass	D	D	D	D	U	U	U	U
Red threeawn	N	U	N	N	N	U	N	N
Cheatgrass ^{2/}	U	D	N	N	U	P	U	U
Black samson	N	D	D	D	D	P	P	D
Prairieclover spp.	N	D	D	D	D	D	D	D
Dotted gayfeather	N	P	P	P	D	P	D	D
Milkvetch spp. ^{3/}	N	D,T	D,T	D,T	D,T	P,T	D,T	D,T
American vetch	N	P	P	D	N	P	P	D
Prairie coneflower	N	D	D	D	D	D	D	D
Wild onion	N	P	P	N	N	P	P	N
Hood's phlox	N	N	N	N	U	U	U	U
Pussytoes spp.	N	N	N	N	U	U	U	U
Western yarrow	N	U	U	N	D	D	D	D
Green sowthistle	N	N	N	N	N	N	N	N
Scarlet globemallow	N	D	D	D	N	D	D	D
Two-grooved poisonvetch	N	T	T	T	N	T	T	T
White point loco	N	T	T	T	T,N	T,N	T,N	T,N
Low larkspur	N	N,T	N,T	N	N	D,T	D,T	N
Death camas	N	T	T	N	N	T	T	N
Winterfat	P	P	P	P	P	D	D	P
Nuttall's saltbush	P	P	P	P	P	P	P	P
Prairie rose	N	N	N	N	D	D	D	D
Silver sagebrush	D	D	D	D	D	D	D	D
Green and Rubber rabbitbrush	U	U	U	U	U	U	U	U
Wyoming big sagebrush	N	N	N	N	P	D	D	P
Rocky Mtn. Juniper	N	N	N	N	U	N	N	N
Snowberry	D	D	D	D	D	D	D	P
Fringed sagewort	N	N	N	N	U	U	U	U
Yucca	N	N	N	N	U	D	D	U
Broom snakeweed ^{4/}	N	N	N	U	U	U	U	U
Creeping juniper	N	N	N	N	U	N	N	N
Plains pricklypear ^{5/}	N	N	N	N	U	U	U	U

^{1/} The awns and sharp seeds of needleandthread can harm livestock when dry.

^{2/} Not a native plant, but a common invader.

^{3/} Some species of milkvetch are poisonous.

^{4/} Broom snakeweed can be poisonous, but this is not usually a problem in Montana because plants die back in winter and do not have green leaves in early spring.

^{5/} The spines can be injurious to livestock.

Ecological Site Description—Rangeland

Silty–Steep, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East

MLRA: 60B – Pierre Shale Plains, East

R058AE004MT, R060BE585MT

13. Wildlife Interpretations: The Silty–Steep ecological site provides generally good habitat for deer because of the sloping topography and the diversity of forb and shrub production. It is generally fair habitat for antelope for the same landscape factors. It provides diverse habitat for many other prairie wildlife species. Some species of special emphasis, such as the mountain plover and swift fox, will use the habitat provided by this site for portions of their life cycle. The following is a description of habitat values for the different plant communities that may occupy the site:

Plant Community 1a and 1b: Tall and Medium Grasses/ Forbs/ Shrubs (HPCP or PPC): The high proportion of grasses plus a diversity of forbs, shrubs and half-shrubs in this community favors grazers and mixed feeders such as bison, pronghorn and elk. Also, the combination of steep topography and complexity of aspect results in higher shrub density and diversity compared to a Silty ecological site. This provides winter feeding habitat (1a.) and thermal and escape cover (1b.) for mule deer. Large animal nutrition levels are relatively high year-long with the diversity of warm and cool season grasses, forbs and shrubs. Complex plant structural diversity and litter cover provide habitat for a wide array of small mammals (both seed-eaters, i.e. deer mice and herbivores, i.e. voles) and neotropical migratory birds. Diverse prey populations are available for raptors like ferruginous and red-tailed hawks. The diversity of grass and forb life forms and heights, along with scattered shrubs and trees, provides habitat for many bird species including the spotted towhee, field sparrow, western meadowlark, sharp-tailed grouse and loggerhead shrike. This community is well suited for ground-nesting birds because of the abundant residual plant material and litter available for nesting, escape and thermal cover.

Plant Community 2a: Medium and Short Grasses/ Medium Shrubs: The partial loss of plant structural diversity makes this community somewhat less attractive to the variety of wildlife species using the HPCP or PNC. A decrease in residual plant material and litter cover reduces the habitat value for ground-nesting birds. Forb and shrub diversity and abundance favors selective feeders like mule deer.

Plant Community 2b: Medium and Short Grasses/ Invader Grasses / Medium and Low Shrubs: The partial loss of plant structural diversity makes this community somewhat less attractive to the variety of wildlife species using the HPCP or PPC. A decrease in residual plant material and litter cover reduces habitat value for ground-nesting birds. Small mammal species composition shifts toward dominance of seed-eaters; mainly deer mice. Forb and shrub diversity and abundance favors selective feeders like mule deer. Kentucky bluegrass invasion provides succulent forage for ungulates early in the season.

Plant Community 3: Medium and Short Grasses, Medium Shrubs and Half-shrubs: The lack of litter cover and vegetative structural diversity results in poor habitat value for ground-nesting birds. Seed-eating small mammals, particularly deer mice may increase along with annual grasses and forbs. Forb and half-shrub production provides forage for mule deer and pronghorn.

Plant Community 4: Short Grasses (Invaders), Medium and Low Shrubs: Wildlife habitat values are considerably reduced at this stage with loss of ground cover and structural diversity. Snowberry provides some hiding cover for mule deer. Kentucky bluegrass provides succulent forage for ungulates, but for only a small portion of the growing season compared to the HPCP or PNC.

Plant Community 5: Short Grasses/ Invader and Annual Grasses / Forbs / Medium and Low Shrubs: Wildlife habitat values are considerably reduced at this stage with loss of ground cover and structural diversity. Snowberry provides some hiding cover for mule deer. Kentucky bluegrass provides succulent forage for ungulates, but for only a small portion of the growing season compared to the HPCP or PNC.

Ecological Site Description—Rangeland

Silty–Steep, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East

MLRA: 60B – Pierre Shale Plains, East

R058AE004MT, R060BE585MT

13a. Plant Preferences for Antelope and Deer:

Legend: P=Preferred D=Desirable U=Undesirable E=Emergency
 N=Nonconsumed T=Toxic Blank=Unknown or no data

Winter (W) = Jan., Feb., March;

Spring (SP) = April, May, June;

Summer (SU) = July, Aug., Sept.;

Fall (F) = Oct., Nov., Dec.

PLANT NAME	Antelope				Deer			
	W	SP	SU	F	W	SP	SU	F
Perennial grasses	P	P	P	P	D	P,D	D	D
Red threeawn	N	N	N	N	N	N	N	N
Annual grasses	N	P,D	N	D	N	P,D	N	D
Sedges	D	P	P	P	D	P	P	P
Black samson	P	P	P	P	D	D	D	D
Prairieclover spp.	P	P	P	P	P	P	P	P
Dotted gayfeather	D	P	D	D	D	P	P	P
Milkvetch spp.	D	P	P	D	D	D	D	D
Scurfpea spp.	N	D	D	D	D	D	D	D
Hairy goldenaster	E	E	E	E	E	E	E	E
Missouri goldenrod	D	P	P	P	D	D	D	D
Western yarrow	D	D	D	D	D	D	D	D
Prairie coneflower	D	P	P	D	D	P	D	D
American vetch	P	P	P	P	D	P	P	P
Hood's phlox	U	U	U	U	U	U	U	U
Biscuitroot spp.	D	D	D	D	D	D	D	D
Green sagewort	N	N	N	N	N	N	N	N
Scarlet globemallow	D	D	D	D	D	D	D	D
Twogrooved poinsonvetch	N, T	N, T	N, T	N, T	N, T	N, T	N, T	N, T
White point loco	N, T	N, T	N, T	N, T	N, T	N, T	N, T	N, T
Death camas	N, T	N, T	N, T	N, T	N, T	N, T	N, T	N, T
Larkspur spp.	N, T	N, T	N, T	N, T	N, T	N, T	N, T	N, T
Winterfat	P	P	P	P	P	P	P	P
Nuttall's saltbush	P	P	P	P	D	P	P	D
Prairie rose	U	U	U	U	E	D	E	E
Silver sagebrush	D	D	P	D	P	P	D	P
Wyoming big sagebrush	P	P	P	P	P	P	D	D
Rabbitbrush spp.	D	D	D	D	D	D	D	D
Rocky Mtn. Juniper	N	N	N	N	D	D	D	D
Snowberry	D	D	D	D	D	D	D	D
Fringed sagewort	D	U	U	D	D	U	U	D
Green sagewort	N	N	N	N	N	N	N	N
Plains pricklypear	N	N	N	N	N	N	N	N
Creeping juniper	N	N	N	N	D	D	D	D
Broom snakeweed	N	N	D	N	D	D	P	P

14. Hydrology Data: The runoff potential for this site is high to very high, depending on slope and ground cover. Runoff curve numbers generally range from 77 to 92. The soils associated with this ecological site are generally in Hydrologic Soil Group C or D. The infiltration rates for these soils will normally be moderate to moderately slow.

Good hydrologic conditions exist on rangelands if plant cover (grass, litter, and brush canopy) is greater than 70%. Fair conditions exist when cover is between 30 and 70%, and poor conditions exist when cover is less than 30%. Sites in high similarity to HCPC (Plant Communities 1 and 2) generally have enough plant cover and litter to optimize infiltration, minimize runoff and erosion, and have a good hydrologic condition. The deep root systems of the potential vegetation help maintain or increase infiltration rates and reduce runoff.

Ecological Site Description—Rangeland

Silty–Steep, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East

MLRA: 60B – Pierre Shale Plains, East

R058AE004MT, R060BE585MT

Sites in low similarity (Plant Communities 3, 4, and 5) are generally considered to be in poor hydrologic condition as the majority of plant cover is from shallow-rooted species.

Erosion is minor for sites in high similarity. Rills and gullies should not be present. Water flow patterns, if present, will be barely observable. Plant pedestals are essentially non-existent. Plant litter remains in place and is not moved by erosion. Soil surfaces should not be compacted or crusted. Plant cover and litter helps retain soil moisture for use by the plants. Maintaining a healthy stand of perennial vegetation will optimize the amount of precipitation that is received. (Reference: Engineering Field Manual, Chapter 2 and Montana Supplement 4).

15. Recreation and Natural Beauty: This site provides recreational opportunities for big game and upland bird hunting, and hiking. The forbs have flowers that appeal to photographers. This site provides valuable open space and visual aesthetics.

16. Wood Products: None

17. Site Documentation:

Authors: Original: REL, AJN, 1983 Revised: JVF, REL, RSN, MJR, SKW, SVF, POH, 2003

Supporting Data for Site Development:

NRCS–Production & Composition Record for Native Grazing Lands (Range-417): 4

BLM–Soil & Vegetation Inventory Method (SVIM) Data: 16

NRCS–Range Condition Record (ECS-2): 30

NRCS–Range/Soil Correlation Observations & Soil 232 notes: 5

Field Offices where this site occurs within the state:

Baker	Ekalaka	Hysham	Sidney
Billings	Forsyth	Jordan	Terry
Broadus	Glendive	Miles City	Wibaux
Circle	Hardin	Roundup	

Site Approval: This site has been reviewed and approved for use:

Rhonda Sue Noggles
State Rangeland Management Specialist

06/30/03
Date

Ecological Site Description—Rangeland

Silty-Steep, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East
MLRA: 60B – Pierre Shale Plains, East
R058AE004MT, R060BE585MT



Silty-Steep 10–14"
Sedimentary Plains, east
Plant Community 1a
HCPC /PPC
Rosebud County
Dry and Warm Slopes



Silty-Steep 10–14"
Sedimentary Plains, east
Plant Community 1a
HCPC /PPC
Bunchgrass community



Silty-Steep 10–14"
Sedimentary Plains, east
Plant Community 1b
Richland County
Cool and Moist Slopes

Ecological Site Description—Rangeland

Silty–Steep, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East
MLRA: 60B – Pierre Shale Plains, East
R058AE004MT, R060BE585MT



Silty-Steep 10–14"
Sedimentary Plains, east
Plant Community 1b
McCone County



Silty-Steep 10–14"
Sedimentary Plains, east
Plant Community 2a
McCone County



Silty-Steep 10–14"
Sedimentary Plains, east
Plant Community 2a
Dawson County

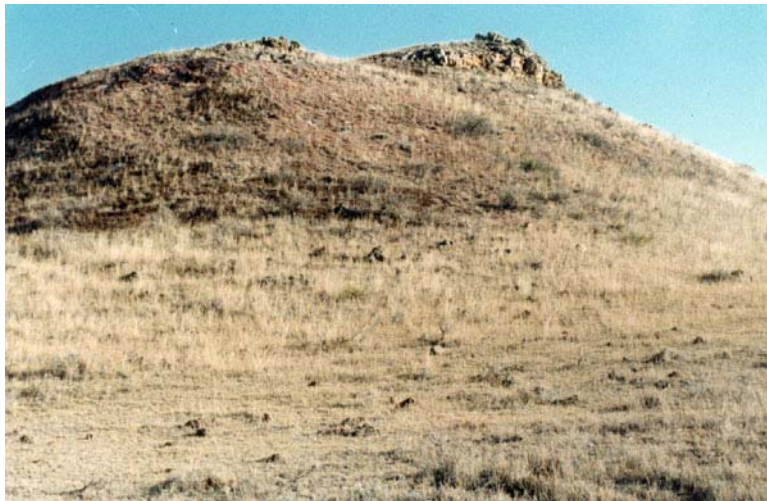
Ecological Site Description—Rangeland

Silty-Steep, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East
MLRA: 60B – Pierre Shale Plains, East
R058AE004MT, R060BE585MT



**Silty-Steep 10–14"
Sedimentary Plains, east
Plant Community 3
Richland County**



**Silty-Steep 10–14"
Sedimentary Plains, east
Plant Community 3
Steeper slopes**



**Silty-Steep 10–14"
Sedimentary Plains, east
Plant Community 3**

Ecological Site Description—Rangeland

Silty–Steep, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East
MLRA: 60B – Pierre Shale Plains, East
R058AE004MT, R060BE585MT



Silty-Steep 10–14"
Sedimentary Plains, east
Plant Community 3
Dense shrub cover



Silty-Steep 10–14"
Sedimentary Plains, east
Plant Community 3
Carter County